

# DIY DNA EXTRACTION

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**Extract and compare your very own DNA samples just like real scientists do!**

## INTRODUCTION

Cells are the building blocks of all living things. The human body is composed of around around one trillion cells. Each cell has a nucleus and other major organelles like cytoplasm, mitochondria, plasma membrane etc.

In a nucleus, the DNA molecule is packaged into thread-like structures called chromosomes. Each chromosome is made up of DNA and proteins called histones. DNA (deoxyribonucleic acid) is the hereditary material in almost all living organisms and contains the instructions needed for an organism to develop, survive and reproduce.

The first and foremost procedure scientists carry out in molecular biology labs is to extract the DNA of the cells they are studying – all tests, analyses and if needed sequencing (the reading of each DNA letters) comes after that.

In this lab we will use a DIY (Do-it-yourself) technique that will allow you to extract DNA from living plant tissues (any fruit or vegetable of your choice) using everyday chemicals you can find in your kitchen. Remember these are not high purity extractions of course – so the DNA will have some contaminants.

## MATERIALS

- Plastic bag
- Jar or beaker that fits strainer or funnel
- Strainer or funnel
- Small test tubes
- Filter (cut to cover the funnel)
- Table salt
- Extraction solution
- Fresh fruit/onion
- Wooden sticks to spool
- Cold 95% ethanol or isopropanol

### **EXTRACTION SOLUTION RECIPE**

For 100 mL of the extraction solution, mix 1 mL of detergent (you can also use shampoo or soap) and 1.5 g of table salt (iodized or non-iodized both will work). Add water to make a final volume of 100 mL. Dissolve the salt by stirring slowly to avoid foaming. Measure 20 mL of solution for each extraction

## **PROTOCOL**

1. Get some pieces of onion/fruit and put them in a plastic bag. Seal the bag and crush the fruit. We smash the onion/fruit by hand and then roll a pen or marker back and forth over the bag to make the fruit as liquid as possible. Make sure you do not damage the bag!
2. Add 20 ml of extraction solution to plastic bag. Continue to roll the sample for about 5 minutes.
3. Filter the mixture through the funnel/filter and set aside for 10 min.
4. Take approximately 2-3 ml of solution into your test tube.
5. Being careful not to shake the tubes, add approximately 2-3 ml of cold 95% ethanol to each tube, preferably using a syringe along the sides of the test tube.
6. Take a look at your tube. What do you see in the top portion of the liquid?
7. Place a stirring rod into the first tube and gently wind the DNA onto it. Be careful not to mix the ethanol and soapy layer.
8. Carefully remove the rod from the tube after winding as much DNA as possible on the stick.
9. Place the DNA into a tube, add a little ethanol if necessary to the tube.
10. Take your DNA home it's all yours.

11. Take a snap of your very own DNA extraction and send it to us!

## WORKSHEET

### QUESTIONS

- What does mashing do to the Onion/fruit?
- Why did you add detergents?
- What do you think the ethanol does?
- Take a look at your tube. What do you see in the top portion of the liquid?
- Is the DNA you extracted is pure? What are the possible impurities?
- What can we do with the DNA once we've purified it?